REMARKS

The specification and claims are amended. Support is found throughout the specification, claims and drawings as originally filed. In particular, support is found at page 7 line 5 to page 8 line 8, pages 17 to 18 and Figures 3 and 4. Proposed corrections to drawings are attached. No new matter is added by the amendments and corrections.

Examiner objects to the drawings for failure to show elements 10, 38 and 110' as described in the specification. Corrected drawings are attached for Examiner's approval. Formal drawings will be submitted after allowable subject matter is identified. Applicants request the objection be withdrawn.

The specification is objected to because of informalities relating to "remote location 112". The specification is amended to correct the informality. Applicants request the objection be withdrawn.

The claims are objected to with respect to informalities in claims 1, 10 and 19 relating to the phrase "said remote locations". The claims are amended to correct the informality. Applicants request the objection be withdrawn.

Claims 1-27 are rejected under 35 U.S.C. §103(a) as being unpatentable over Lemoine (US 5,631,839) in view of Foster (US 5,565,162). Applicants traverse the rejection to the extent that it can be maintained.

Briefly, Applicants have invented a system that enables a machine driven self-adjustment of the process controller's internal programming in two, three or multiple controller units from a location remote to the process of the value of an operational parameter for manufacturing processes for composite articles. The system comprises at least one sensor in each manufacturing unit measuring the operational parameter, a signal generator for producing a digital signal from the sensor, a transmitter for transmitting the digital signal to a process controller at the remote location, process control software associated with the controller to self-adjust the operational parameter and a transmitter for transmitting the adjusted value from the remote location to the manufacturing process control programs. The system enables the remote site to change programming of each of the multiple process controllers on a real time basis. Monitoring a process condition for the purpose of controlling the condition with respect to a defined operational parameter as taught by the prior art is distinct from the function of monitoring a process condition for the purpose of adjusting the operational parameter. The

Applicants' system adjusts the operational parameters that relate to key variables affecting quality and production rate from a location remote from the manufacturing location as the process is in progress. The manufacturing processes can be located at the same site or at geographically separate sites with the adjustment arising from a remote site.

Lemoine discloses a system for monitoring variables associated with a manufacturing process within a plant site from a location remote but within the plant locus and adjusting components (actuators such as motors, pumps, valves, etc.) of the manufacturing apparatus to control the variables with reference to pre-selected values. The Lemoine process controller performs a table lookup function (column 3 line 45). The values of process variables are compared to pre-selected values for operational parameters from the table, and adjustments are made to process components to reset transient process values to the pre-selected values from the look-up table (Summary of the Invention, column 5 lines 46-62). There is no teaching or suggestion by Lemoine that the process controller performs any calculations or otherwise evaluates and adjusts the operational parameters on a real time basis to optimize the process. Lemoine does not teach or suggest process control software that self-adjusts the operational parameters. Further, Lemoine does not teach or suggest that the remote site has the ability to change programming of the process controller on a real time basis.

Foster adds nothing the primary reference. Foster discloses nothing about process control. Foster suggests a simple method of resin transfer molding whereby reinforcement material is infused with molding fluid by means of capillary action. The mold apparatus of Foster includes a "bag" that provides backing and support for the reinforcement material. Fluid may be circulated through the bag to regulate temperature and pressure within the mold apparatus. Foster does not disclose sensors, actuators or features of his apparatus other than a mold body, an inflatable bag and sources of various fluids. Regarding Examiner's comment of inherency with respect to sensors, although sensors, actuators and the like may be desirable for the Foster apparatus, they are not necessary to the function of the apparatus. Inherency is not appropriate in obviousness combination, requires certainty and cannot be based on possibilities or probabilities. There is no teaching with respect to operational control parameters, and means to adjust control parameters on a real time basis. There is no motivation for a person of ordinary skill to combine Foster with Lemoine, and if combined, the teachings are insufficient to include all of the limitations of Applicants' invention as claimed. Applicants' respectfully submit that

Examiner has not made a *prima facie* case for obviousness and request that the rejection for obviousness be withdrawn.

Claims 2-9, 11-18 and 20-27 depend from claims 1, 10 and 19, respectively. Applicants respectfully submit that claims 1, 10 and 19 are allowable for the reasons stated above. It is axiomatic that claims dependent from an allowable claim are also allowable.

Applicants respectfully submit that the claims are allowable over the art of record and respectfully request prompt passage of claims 1-27 to allowance.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE".

Respectfully submitted,

13 June 2003
Date

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification

Paragraph beginning on page 17, line 1 has been amended as follows:

Conventional, real-time monitoring and control of the manufacturing process from a remote location has not been feasible. Figure 3 shows such a system 110 in which the manufacturing process performed at site 112 is monitored and controlled on a real-time basis at remote location 114. At remote manufacturing location 112, each machine is equipped with a group of sensors 116 which monitor and record discrete operating parameters and features. The digital output from sensors 116 are transmitted to the Hub Network Server 118. Server 118 is in communication with remote location 114 either through both a dedicated voice telephone line 120 and through an Internet connection 122 to an Internet service provider 124. To provide a measure of security to the data, a fire wall 126 is installed in connection with the Internet communication to server 118. A leased line 128 is used to connect the Internet service provider 124 to the remote location 114. A fire wall 130 provides protection of the data stored at remote location 114.

In the Claims

Please amend the claim 1, 10 and 19 as follows:

1. (AMEND) A system for the [monitor and] control from a remote location of at least one discrete measurable operational parameter of a manufacturing process for manufacturing composite articles at [a] two or more manufacturing locations comprising:

a. at least one sensor measuring said operational parameter of the manufacturing process for a composite comprising a resin and a reinforcement;

b. a signal generator connected to each of said at least one sensor for producing a digital signal [for each of said at least one sensor];

c. a transmitter for transmitting said digital signal[s] to said remote location[s];

d. a process[or] controller provided at said remote location for processing said transmitted digital signal[s]; [and]

e. process control software associated with said process controller wherein said process control software self-adjusts said operational parameter for said at least one sensor; and

f[e]. a transmitter for sending operational instructions from said remote location to said manufacturing locations wherein the remote site has the ability to change programming of the process controller on a real time basis.

10. (AMEND) A system for the [monitor and] control from a remote location of at least one discrete measurable operational parameter of a manufacturing process for manufacturing a fiber reinforced thermoset product at [a] two or more manufacturing locations comprising:

a. at least one sensor measuring said operational parameter of the manufacturing process for a composite comprising a thermoset resin and a reinforcement;

b. a signal generator connected to each of said at least one sensor for producing a digital signal [for each of said at least one sensor];

c. a transmitter for transmitting said digital signal[s] to said remote location[s];

d. a process[or] controller provided at said remote location for processing said transmitted digit signal[s]; [and]

e. process control software associated with said process controller wherein said process control software self-adjusts said operational parameter for said at least one sensor; and

f[e]. a transmitter for sending operational instructions from said remote location to said manufacturing locations wherein the remote site has the ability to change programming of the process controller on a real time basis.

19. (AMEND) A system for the [monitor and] control from a remote location of at least one discrete measurable operational parameter of a manufacturing process for reheating thermoplastic at [a] two or more manufacturing locations comprising:

a. at least one sensor measuring said operational parameter of the manufacturing process for a composite comprising a thermoplastic resin and a reinforcement;

b. a signal generator connected to each of said at least one sensor for producing a digital signal [for each of said at least one sensor];

c. a transmitter for transmitting said digital signal[s] to said remote location[s];

d. a process[or] controller provided at said remote location for processing said transmitted digital signal[s]; [and]

e. process control software associated with said process controller wherein said process control software self-adjusts said operational parameter for said at least one sensor; and

f[e]. a transmitter for sending operational instructions from said remote location to said manufacturing locations wherein the remote site has the ability to change programming of the process controller on a real time basis.

Please add new claims 28-33.

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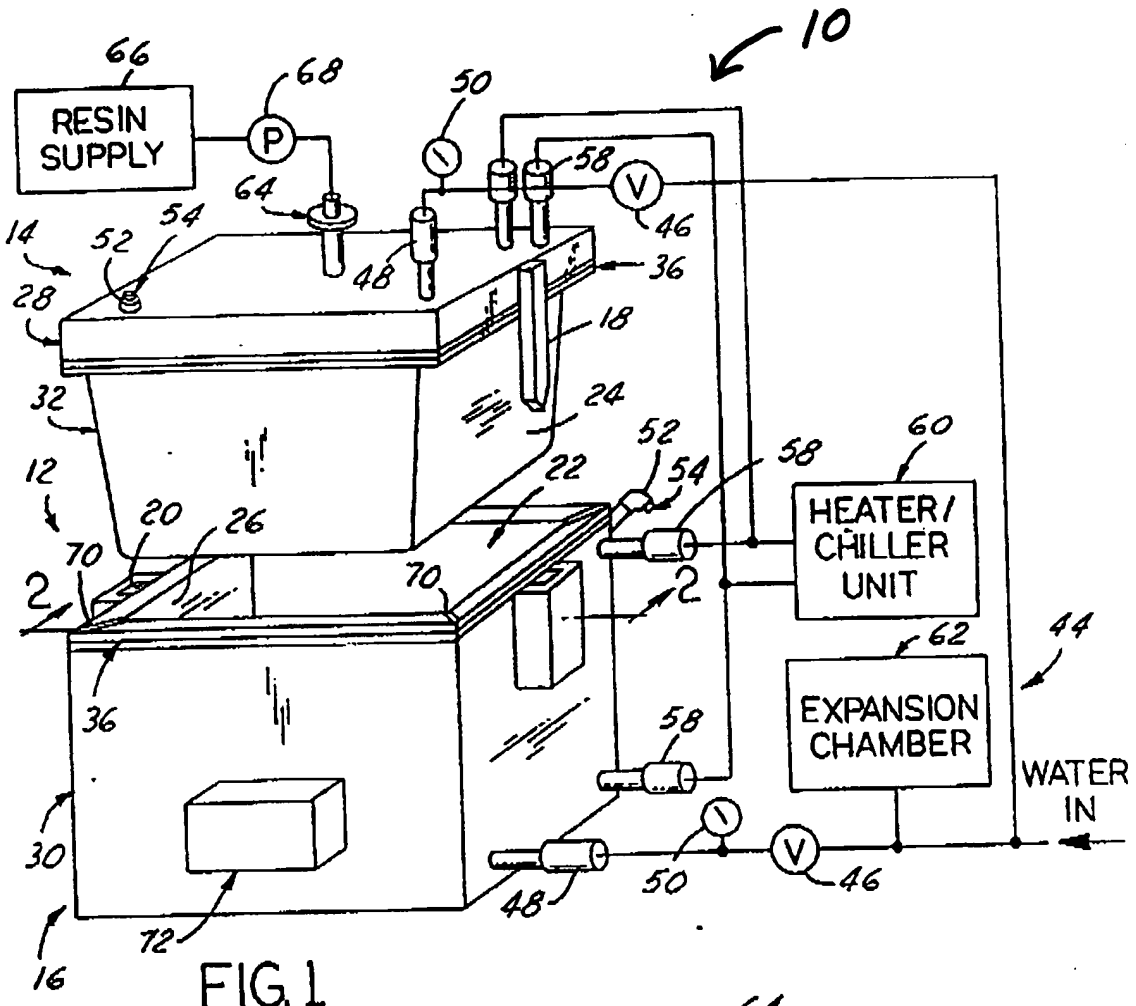

FIG. 1

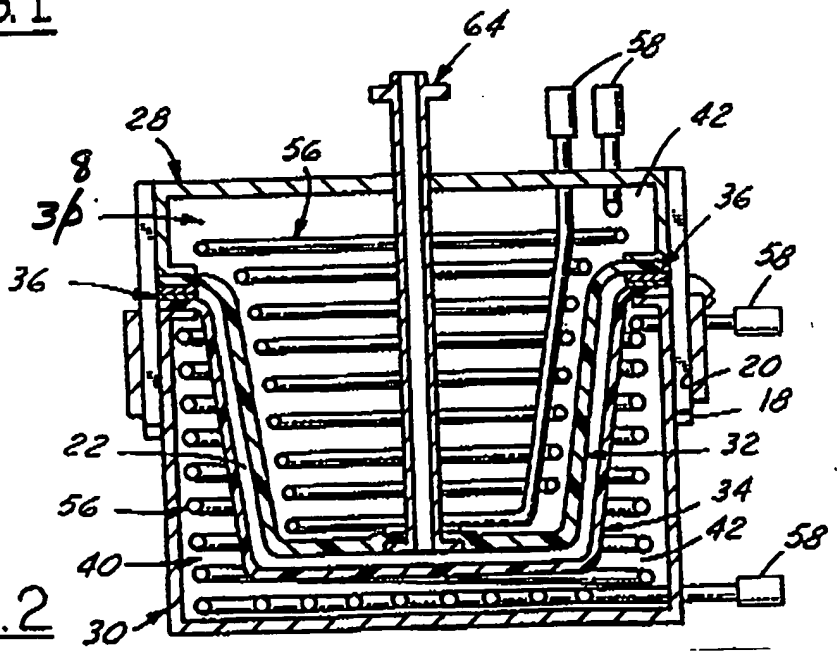

FIG. 2

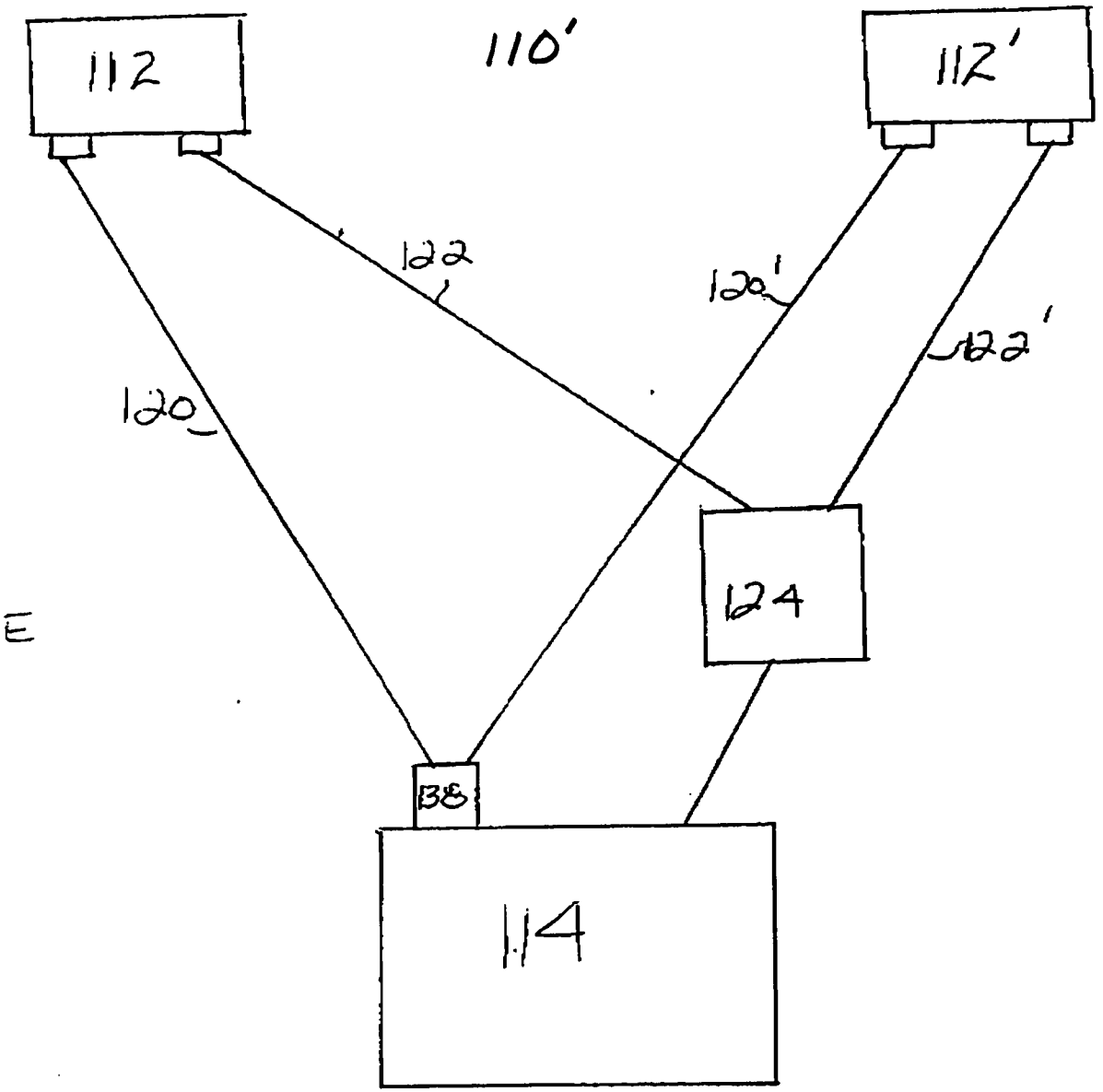

FIGURE 4